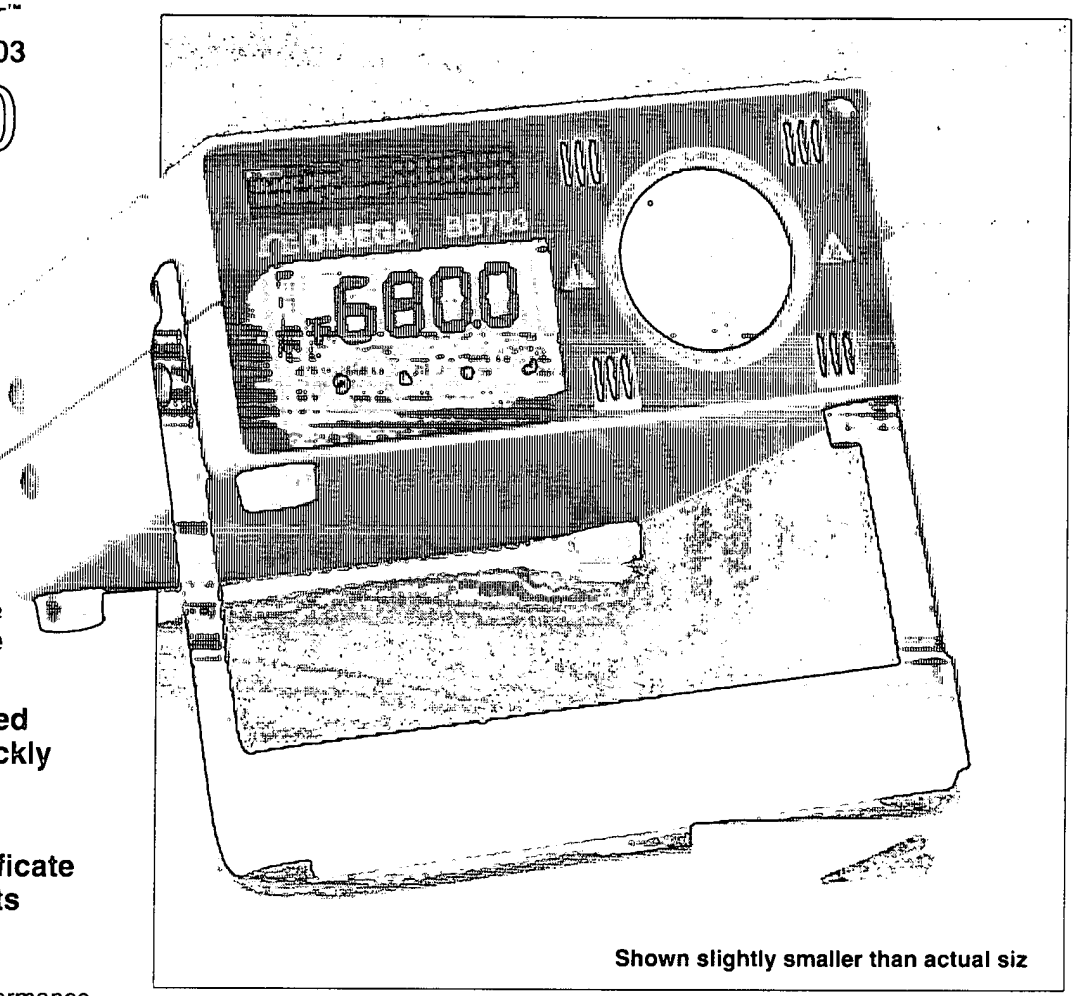
Miniature Blackbody Calibration Source

Portable Design and High Temperature Range

230 Vac model only

BLACKPOINT™
Model BB703
$890
Basic Unit



Shown slightly smaller than actual siz

- **Calibrates from Ambient +10 to 400°C (Ambient +20 to 752°F)**
- **Portable Miniature Design**
- **Built-in Digital 1/32 DIN Temperature Controller**
- **Calibrates Infrared Instruments Quickly and Accurately**
- **NIST-Traceable Calibration Certificate with 3 Data Points Included**

The BB703 is a high performance, rugged, miniature blackbody calibrator. It is used for infrared pyrometer calibrations with a temperature range of ambient +10 to 400°C (ambient +20 to 752°F). With its unique miniature design and built-in 29 mm (1.125") target plate, the BB703 is an ideal and economical infrared calibrator for any laboratory or field service application.

OMEGACARE℠ extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order.

Caution: To avoid fire hazard or damage to your calibrator, always allow your calibrator to cool down to ambient temperature before returning to storage.

Specifications

Temperature Range: Ambient +10 to 400°C (Ambient +20 to 752°F)
Accuracy: ±1.4°C (±2.5°F)
Resolution: 0.1°
Stability: 0.3°C (±0.5°F)
Ambient Operating Range: 0 to 40°C (32 to 104°F)
Target Emissivity: 0.95
Target Plate Diameter: 29 mm (1.125")
Power: 115 Vac, 50/60 Hz or 230 Vac, 50/60 Hz, 175 W
Size: 127 x 56 x 155 mm (5 W x 2.2 H x 6.1" D)
Weight: 1.09 kg (2.4 lb)

We make running changes when technical advances allow. Check at time of ordering for additional features.

To Order (Specify Model Number)

Model No.	Price	Description
BB703	$890	Miniature blackbody calibration source, 115 Vac
BB703-230VAC*	890	Miniature blackbody calibration source, 230 Vac

**Note: Only 230 Vac model is available as CE marked.*

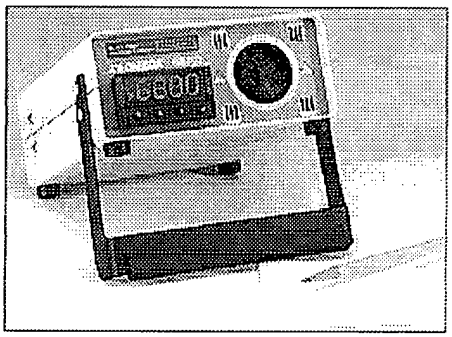
Ordering Example: **BB703**, 115 Vac Blackbody Calibration Source, **$890**. *OMEGACARE℠ extends standard 3-year warranty to a total of 4 years ($89), $890 + 89 = **$979.***

BB703

Infrared Calibrator: Miniature Blackbody Calibration Source, Portable Design, Models BB703 and BB703-230VAC

3 YEAR WARRANTY · NEW · CE · OMEGA CARE · Y2K COMPLIANT · MADE IN USA

$895.00
BB703



Click **here** for larger image.

- **Calibrates from Ambient +10 to 400°C (Ambient +20 to 752°F)**
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Click Here for Product Specs.

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For complete product specifications see the Related Links section at the bottom of this page.

To Order (Specify Model Number)

Part Number	†Price	Description	Qty
BB703	$895.00	Blackbody Calibration source, 115 Vac, range: Ambient +10 to 400°C (Ambient +20 to 752°F)	0
BB703-230VAC	$895.00	Blackbody Calibration Source, 230 Vac, range: Ambient +10 to 400°C (Ambient +20 to 752°F)	0

ADD TO CART > VIEW CART > EMPTY CART > CHECK OUT >

† *All dollar amounts on this site are shown in US currency.*
Note: Only 230 Vac model is available as CE marked.
OMEGACARE[SM] extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order.
Ordering Example: (1) **BB703** 115 Vac Blackbody Calibration Source (comes complete with operator's manual and NIST traceable calibration certificate) = $**895**

Related Links

Literature

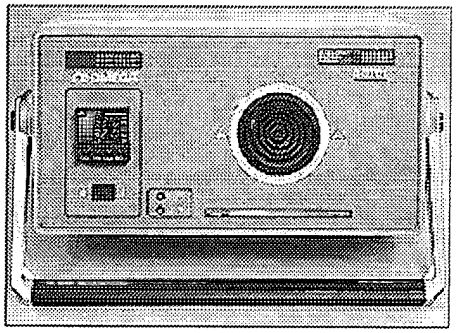
Download complete Product Specifications in PDF format.

BB701

Infrared Calibrator: Hot/Cold Blackbody Calibration Source, Models BB701 and BB701-230VAC

2 YEAR WARRANTY NEW CE OMEGA CARE 2000 MADE IN USA

$ 2,995.00
BB701



Click **here** for larger image.

- **Model BB701 Calibrates from -19 to 149°C (0 to 300°F)**
- **Portable Rugged Design**
- **Calibrates Infrared Pyrometers Quickly and Accurately**
- **Built in Digital PID Autotune Temperature Controller with Temperature Readout**
- **NIST Traceable Calibration Certificate Included with Three Data Points**
- **RS-232 Standard**
- **Special Nitrogen Purge Collar Limits Target Plate Frosting at Low Temperatures**
- **Built-in RTD Reference Probe Output**

The BB701 Blackbody Calibrator is a high performance, rugged, portable calibrator for infrared pyrometers. The BB701 Hot/Cold model has a range of -19 to 149°C (0 to 300°F). The BB701's ability to provide a stable, repeatable cold calibration point allows the user to calibrate or test most infrared pyrometers quickly and accurately without having to prepare an ice bath. The target plate has a known emissivity, enabling the user to calibrate virtually any infrared pyrometer with a spot size diameter of 63.5 mm (2.5") or smaller. Both models come with an RS-232 computer interface which allows computer control of the setpoints for automatic test applications. An NIST traceable calibration certificate is also provided.

For complete product specifications see the Related Links section at the bottom of this page.

To Order (Specify Model Number)

Part Number	†Price	Description	Qty
BB701	$2,995.00	Hot/Cold Blackbody Calibration Source, 115 Vac, range: -19 to 149°C (0 to 300°F)	0
BB701-230VAC	$2,995.00	Hot/Cold Blackbody Calibration Source, 230 Vac, range: -19 to 149°C (0 to 300°F)	0

ADD TO CART > VIEW CART > EMPTY CART > CHECK OUT >

† *All dollar amounts on this site are shown in US currency.*
Note: Only 230 Vac model is available as CE marked.
OMEGACARE^{SM} extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order.
Ordering Example: (1) **BB701** Hot/Cold Blackbody Calibration Source (comes complete with operator's manual, reference probe connector and NIST traceable calibration certificate) = $**2995**

Related Links

Literature

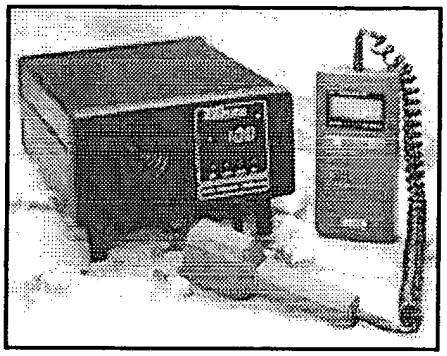
Download complete Product Specifications in PDF format.

SRI COMM INSTRUMENTS SDN. BHD.

Towards New Horizons

Infrared Calibrator

Infrared Calibrator Model 9130



Instant verification of IR thermometer accuracy Certified traceable to NIST Lightweight yet rugged for portability Quick and uncomplicated operation.

If you've got an infrared thermometer, then you know IR sensors need frequent accuracy checks. When IRs need calibration, they can't be calibrated conventionally like thermocouples, RTDs and other sensors. You need a special IR sensor calibrator. The Hart Model 9130 handles almost any type of infrared thermometer.

Simply point your IR thermometer at the Model 9130's calibration target and adjust your IR unit to the digital readout on the calibrator. You get a NIST traceable reading of the target temperature within 0.5° C.

The specially machined concentric rings in the calibration target, or "blackbody," reduce surface reflectance and assure a true temperature reading. A high emissivity coating is baked on the target to give accurate calibration of your IR thermometer. Emissivity of 0.95 is within the range of all adjustable IR meters.

A custom etched-film heater produces the required calibration temperature and is controlled by a high grade platinum RTD sensor embedded behind the front surface of the target. The digital controller and the platinum sensor are system calibrated in Hart 's lab to assure NIST traceable accuracy in your

calibrator. A thermometer reference well is drilled into the target block for an optional standards thermometer if increased accuracy is needed. With a block stability as high as 0.1°C, precision calibrations are easy to do.

Temperature setpoint changes are easy, and temperature stabilization occurs within ten minutes, This seven pound calibrator is easy to take practically anywhere for on-site calibrations.

Any instrument service shop or calibration lab benefits from an excellent calibration tool like this one. Maintain your industrial IR thermometers and sensors using the newest and best IR calibration instrument available.

Model 9130 Specifications

Range :	**°C Version:** 35°C to 199.9°C **°F Version:** 95°F to 400°F
Stability:	±0.1°C

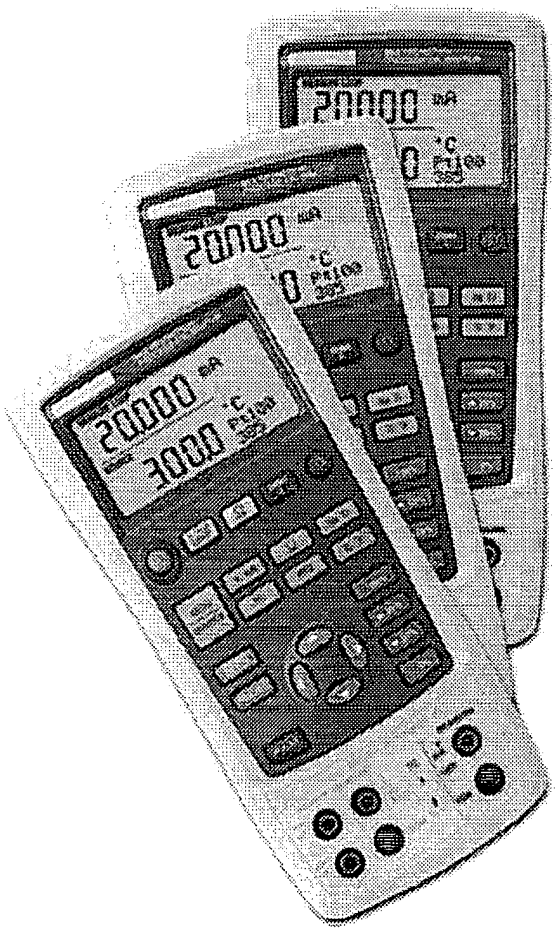
Accuracy:	±0.5°C
Controller:	Microprocessor-based PID digital controller. Displays actual and set temperatures.
Temperature Setting:	Digital with pushbutton data entry
Cooling:	Built-in cooling fan
Stabilization:	Appox. 10 Min
Target Size	: 2.25 inches (63.5 mm) dia
Emissivity:	0.95
Reference Well:	Test well drilled in the test target for verification of calibrator accuracy using a standards probe.
Size :	3.5"H x 7.5"W x 10"D (89mm x 191mm x 254mm)
Power:	120VAC (240VAC optional, add"-E" to the model number.)
Weight:	7 lbs (3.2 kg)
Carrying Case:	Optional, ABS tough foam case with O-ring
Calibration Certificate:	Included, with data. States compliance and traceability to NIST standards.
Ordering Information:	9130C Infrared Calibrator °C 9130F Infrared Calibrator °F 9301 Rugged Carrying Case

: Any enquiry ? Please email to us (sci@pop.jaring.my)

Main Menu Home Page

Posted on: 10/02/2000

Understanding Specifications for Process Calibrators



Traceable measurements ensure the uniformity and quality of manufactured goods and industrial processes.

The initial selection of a calibrator often is based on a specification sheet - a writte description of the equipment's performance in quantifiable terms that applies to al calibrators having the same model number. Because specifications are based on statistics of a large sample of calibrators, they describe the performance of a grou than a single, specific calibrator. Any single calibrator would meet all the specifica usually would significantly exceed most of the various specification details.

Good specifications have the following characteristics:

u They are complete.

u They are easy to interpret and use.

u They include the effects found in normal usage such as environment and loadin

Completeness requires that sufficient information be provided so the user can det bounds of performance for all anticipated outputs (or inputs), all possible and perr environmental conditions within those bounds, and all permissible loads.

Ease of use also is important. Many specifications can be confusing and difficult t thus causing mistakes in interpretations that can lead to application errors or fault calibrations.

The requirement for completeness conflicts somewhat with that for ease of use; o traded for the other. The challenge of specification design is to mutually satisfy bc is sometimes accomplished by bundling the effects of many error contributions wi useful, common window of operation. For example, the listed performance may b a period of six months when used in a temperature range of 23°C 15°C, in humidit 80%, and for all loads up to a specified maximum rating. This is a great simplificat user because the error contributions of time, temperature, humidity and load are i the basic specification and can be ignored as long as operation is maintained witl listed bounds.

The Importance of Specifications

Comprehensive specifications are essential in maintaining a chain of traceability a ensuring global uniformity of products, quality and safety.

Traceability. Traceability is a term that refers to the fact that instruments have bee to conform with the official standards for the parameters they measure. This mear measurements made by this equipment are traceable to national standards. A cer instrument is one that has been tested regularly by even better-performing certifie Specific test procedures are used, and the results are documented and must be r specific time intervals. This chain sequence of comparing to superior performing, devices is repeated until, finally, specific comparisons are made with standards m by national authorities such as the National Institute of Standards and Technolog the United States. This unbroken chain of comparisons often is called a "traceabil

For a process calibrator, traceability refers to the fact that the process calibrator's measurement functions have been verified to perform within its required specifica that this usage of the calibrator falls within the appropriate limits of performance, i signal levels, environmental conditions, conditions of use and time between perfo verifications. The performance usually is checked using the procedures recomme the manufacturer and the recommended types of superior performing equipment.

Traceable measurements ensure the uniformity and quality of manufactured good industrial processes. They are essential to the development of technology. Withou traceable measurements, variances can occur in product/process quality that ofte costly. Bad quality is expensive, both in terms of cost to rectify and in damage to a company's reputation. Traceable measurements also support equity in trade as w compliance to regulatory laws and standards.

The global acceptance of the ISO 9000 quality standards also has led to an increa commercial requirements for the traceable calibration of test and measurement e

The purpose is to ensure that the products manufactured in one country will be ac in another on the basis of agreed-to measurement standards, methods and practi

How Good Should a Calibrator's Specifications Be?

Whether doing instrument calibration, industrial process control or even product performance testing, the equipment performing the test must always have superic performance when compared to the tolerances of the test. Test Uncertainty Ratio describes the ratio of test tolerance to the superior performance of the testing equ eliminate undesired effects due to errors in the calibration equipment, it is desired test equipment's performance be 10 or more times better than the test tolerance li However, often this is not practical to achieve. Consequently, it has been shown t equipment is three to five times better than the test tolerance, then the calibration error has no practical consequence. As a result, it is commonly accepted in indus four-to-one ratio is an adequate TUR. For example, if a transmitter with an accura specification of 1% is to be checked by a calibrator, the performance of the calibra the test must be better than or equal to 0.25% (thereby having a minimum of four better performance than the transmitter).

Calibrator Performance vs. Its Specifications

It must be understood that the published specifications of equipment apply to an entire population of equipment provided by a manufacturer, not just one individual piece of equipment. Consequently, an individual piece of equipment should not just marginally meet its published specifications but usually should perform much better than its published specification. Just how much better is determined by the philosophy and policies of the manufacturer.

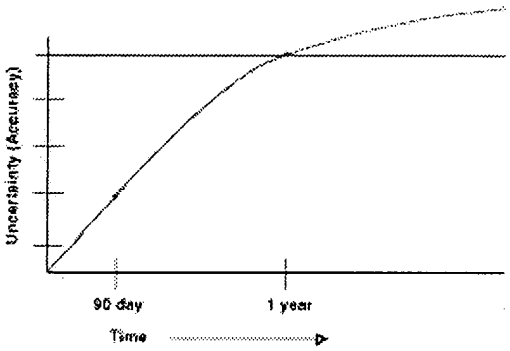


Figure 1. A calibrator can be specified to supe performance levels at the time of calibration; l such levels are only good for a few minutes fc calibration.

Interpreting Specifications. Many companies have complex procedures and tests that a calibrator must pass prior to purchase and acceptance. But, before that evaluatio begin, one must decide which calibrators should be evaluated. The calibrator spe usually are the first step in the process.

Ideally, specifications are a written description of a calibrator's performance that o quantifies its capabilities. It should be remembered that specifications do not equa performance - they are performance parameters. They can be conservative or ag Manufacturers are not bound by any convention as to how they present specificat

The buyer also should be aware that a calibrator specification applies to an entire run of a particular instrument model. Because variation in the performance of indi calibrators from nominal tends to be distributed normally, a large majority of the u specific model should perform well within their specification limits. In fact, most in calibrators can be expected to perform better than specified, although the perform individual calibrator should never be taken as representative of the model class a

The calibrator will most likely provide reliable performance, but there is always a s chance that its performance will be marginal, or even out of specification, at some parameter or function.

Accuracy vs. Uncertainty. Typically, the number on the cover of a data sheet or bi read "accuracy to 0.02%." This is commonly accepted usage equivalent to saying "measurement uncertainty of 0.02%." It means that measurements made with the can be expected to be within 0.02% of the true value. In examining a specification to be aware that a specification such as this:

- Is often over the shortest time interval.
- Is often over the smallest temperature span.
- Is sometimes a relative specification.
- May be derived using a nonconservative confidence level.

Consider the impact of each of these factors.

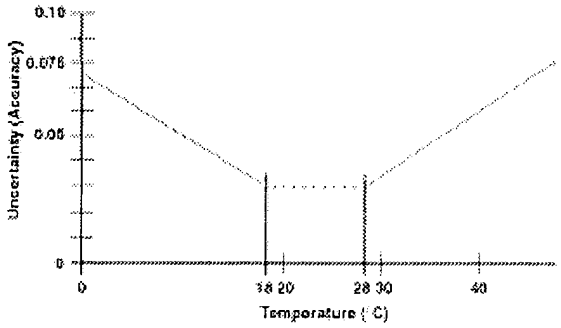


Figure 2. Out the specified range, a temperature c is used to describe the degradation of the accurac specification.

Time. Specifications usually include a specific time period during which the calibrator can be expected to perform as specified. Setting this time period or calibration interval is necessary to account for the drift rate inherent in a calibrator's analog circuitry. This is the calibration interval, or the measure of a calibrator's ability to remain within its stated specification for a certain length of time. Time periods of 30, 90, 180 and 360 days are commo practical. Figure 1 shows how a calibrator's uncertainty increases over time. Whe evaluating specifications, make sure you're comparing the same time intervals.

Any calibrator can be specified to super-high performance levels at the time of ca Unfortunately, such levels are good for only the first few minutes following calibrat specifications for a calibrator do not state the time interval over which they are val manufacturer should be contacted for a clarification.

Temperature. Performance over the specified temperature range also is critical. M the temperature intervals specified will meet your workload requirements.

The specified temperature range is necessary to account for the thermal coefficie calibrator's analog circuitry. The most common ranges are centered about room temperature, 23°C I5°C. This range reflects realistic operating conditions. Remem temperature bounds must apply for the entire calibration interval. Thus, a tempera specification of 23°C I1°C presumes very strict long-term control of the operating environment. Such a temperature range would not be representative of normal op a process calibrator.

Outside the specified range, a temperature coefficient (TC) is used to describe th degradation of the accuracy specification. The TC represents an error component be added to a calibrator's specification if it is being used outside of its nominal ten

range. A temperature coefficient graph is shown in figure 2.

In figure 2, as an example, the uncertainty as a function of temperature at full sca 11 V DC range of a calibrator is shown. The dashed line shows the specified acc 23°C 15°C temperature range. Within the span of the dashed line, the accuracy is specifications of 0.030% of full scale. This is in line with a specification of "0.025% reading +0.005% of full scale when used at 23°C 15°C." This applies for a range o C. Beyond this range, the instrument's performance degrades as shown by the sc TC usually will take the form:

TC = X %

°C

where X is the amount the performance degrades per change in degree beyond tl range specification. To calculate the accuracy due to temperatures outside of the specification, the temperature modifier, Tmod, is needed. The formula is:

T_{mod} = |TC x gt|

where gt is operating temperature minus the temperature range limit, t is the prop operating temperature, and range limit is the range limit that t is beyond.

If one wishes to use a calibrator in an ambient temperature outside of its specifiec the effects of TC must be added to the baseline accuracy specification when calc total accuracy. Tmod is used to calculate the total specification using the general

Total Spec = (Basic Accuracy at a Specific Temperature Range) + T_{mod}

For example, suppose you have a calibrator that has rated accuracy of 0.030% at C. Its TC is 0.0025%/°C. To calculate the accuracy of the calibrator for operation (32°C):

t = 32

Range Limit = 23 + 5 = 28

T_{mod} = 0.0025% |32-28|

T_{mod} = 0.0025%|4| = 0.01%

total spec =0.030% +0.010%

= 0.040%

As can be seen, the specification may change dramatically when the effects of performance due to temperature are considered.

Knowing how to calculate Tmod will be necessary when comparing two instruments that are specified for

Vendor	Stated Specification at 10 V	Cor
X	0.010%	
Y	0.025%	

Table 1. Specifications r

different temperature ranges. To truly compare the two calibrators, one needs to put them in the same terms (23°C ±5°C) using the preceding calculation.

conservative to ensure t
calibrator is in tolerance
end of its calibration inte

Most modern calibrators are specified to operate in wider temperature ranges bec
calibration instruments are no longer used only in the closely controlled laboratory
Calibration at the process plant demands greater temperature flexibility.

Allowance for Traceability to Standards. Uncertainty specifications also must be e
as relative or total. Relative uncertainty does not include the additional uncertainty
reference standards used to calibrate the instrument. For example, when a calibra
uncertainty is specified as relative to calibration standards, this covers only the un
in the calibrator. This is an incomplete statement regarding the instrument's total
uncertainty. Total uncertainty includes all uncertainties in the traceability chain: th
uncertainty of the unit plus the uncertainty of the equipment used to calibrate it.

Confidence Level. The most critical factor in a calibrator's performance is what pe
of the calibrators will be out of calibration at the end of its calibration interval. Spe
must be conservative to ensure the calibrator is in tolerance - with a high degree o
confidence - at the end of its calibration interval.

For example, say that vendors X and Y offer calibrators. Vendor X's specifications state that its calibrator can supply 10 V with an accuracy of 0.019%, and vendor Y's specification is 0.025% accuracy for the 10 V output. Neither of the data sheets for the calibrators supply a confidence level for the specifications, nor do they state how the accuracy is distributed.

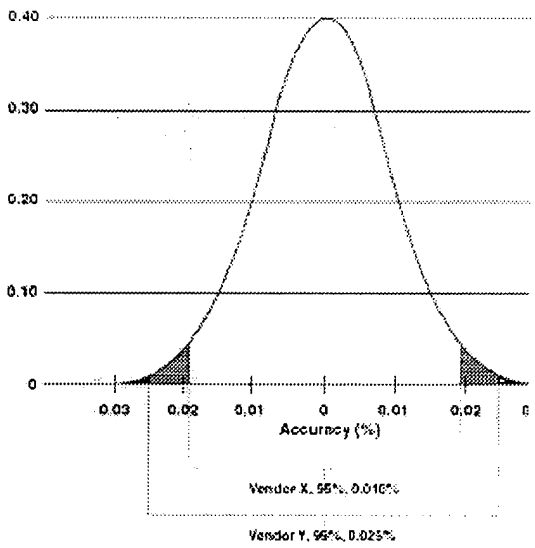


Figure 3. Identical calibrator performance can
different specifications, depending on how agg
the manufacturer chooses to be.

When questioned, the vendors will state that their specifications are based on a n
distribution of accuracy and have the following confidence levels. Their responses
tabulated in table 1.

In this example, the actual performance of the calibrators is identical (figure 3). Ve
choosing a confidence level of 95%, is willing to risk 5% of their calibrators being
of spec at the end of the stated time interval, and states a spec of 0.019%. The sl
solid areas under the normal distribution curve represent the fraction of the calibra
population at risk. Vendor Y, choosing a confidence level of 99%, is willing to risk
their calibrators being found out of spec, and states a spec of 0.025%. The solid a

under the curve represent the fraction of the calibrator population at risk. So you s identical calibrator performance can yield different specifications, depending on h aggressive the calibrator manufacturer chooses to be with the specifications of yo calibrator.

Before making a purchase, it is critical to gain an understanding of a vendor's phil with respect to confidence level and ask the vendor to clarify the confidence level there is doubt as to what it is.

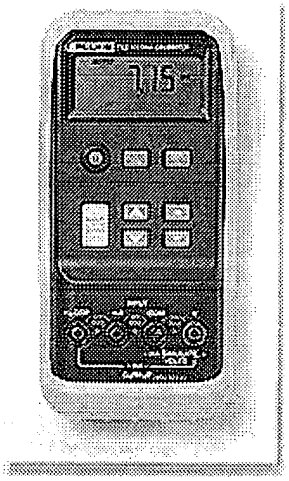
Accuracy specifications are an important part of determining whether or not a par calibrator will satisfy a need. There are, however, many other factors that determi calibrator is best suited for an application, including the work load, support standa of manufacturer support and reliability.

This article has been adapted from "Chapter 31: Instrument Specifications" in *Calibration Philosophy in Practice*, Second Edition, Fluke Corp., 1994.

FLUKE INSTRUMENTS

The Fluke 710 Series Process Calibrators

Fluke 715 Volt/mA Calibrator



The Fluke 710 Series Process Calibrators offer a clear new choice in single-function calibrators. These hand-held calibrators deliver outstanding performance, durability and reliability. Offered in the rugged Fluke 80 Series DMM package, the calibrators are compact, lightweight, and easy to carry. With a push button interface similar to the multifunction Fluke 740 Series Documenting Process Calibrators, the 710s are easy to use. Each calibrator is EMI tolerant, dust and splash resistant, and features a removable battery door for quick battery changes.

Features

- Measure loop current (0-20 mA, 4-20 mA) signals with 0.025% accuracy and 1 mA resolution
- Measure voltage output process signals from PLCs, transmitters
- Source or simulate 24 mA loop current
- Source voltage to 100 mV or 10V
- 24V loop supply with simultaneous current measurement

Function Specifications	
Loop Supply	**Range:** 24 V dc **Resolution:** N/A **Accuracy:** +/- 10% Note: Drive; 20 mA into 1000 W for battery >6.8V; 700 W for battery 5.8 to 6.8 V
Measure/simulate mA/% of span	**Range:** 0 to 24 mA (-25% to 125%) **Resolution:** 0.001 mA **Accuracy:** 0.015% + 2 counts Note: Sink (simulate transmitter) Display mA or % of span
Measure/simulate mV	**Range:** 0 to 100 mV **Resolution:** 0.01 mV **Accuracy:** 0.02% + 2 counts
Measure/simulate V	**Range:** 0 to 10 V

	Res lution: 0.001 V **Accuracy:** 0.02% + 2 counts

General Specifications	
Operating temperature:	-10°C to 55°C
Non-operating temperature:	-40°C to 60°C
Relative humidity (% RH operating without condensation):	95% (10°C to 30°C); 75% (30°C to 40°C); 45% (40°C to 50°C); 35% (50°C to 55°C)
Operating altitude:	3,000m max
Vibration:	Random, 2g, 5-500 Hz
Shock:	1m drop test
Safety:	CSA C22.2 No. 1010.1:1992
Power:	Single 9V battery ANSI/NEDA 1604A or IEC 6LR619V alkaline
Size (with holster):	201 mm L x 98mm W x 52 mm D (7.93 in X 3.86 in x 2.06 in)
Weight (with holster):	Approx. 600g (21 oz)
Size (without holster):	187 mm L x 87mm W x 32 mm D (7.35 in X 3.41 in x 1.25 in)
Weight (without holster):	Approx. 330g (12 oz)
Display:	Clear, 5 digit liquid crystal
Warranty:	3 years

Model Name	Product Description
Fluke-715	Volt/mA Calibrator. Calibrator includes: C81Y Protective Yellow Holster with Flex-StandTM, Test Leads and Alligator Clips, single 9V alkaline battery, Instructions Sheet (14 languages).

Model 715 ◦ Multimeter
Basic Price $795.00 + S&H

ORDER NOW

VIEW CART

*** A MINIMUM ORDER OF $100 REQUIRED**

Model Name	Accessory or Option Description
80T-150U	Universal Temperature Probe
80T-IR	Non-Contact Infrared Temperature Probe
80TK	Thermocouple Module (Not 179)
AC20	Industrial Test Clips
AC80	Hook-Style Test Clips
C100	Universal Carrying Case
C25	Soft Case DMM with Holster
C510	Leather Meter Case
C530	Leather Accessory Case
C550	Tool bag
C800	Hard Storage Case
C81G	Holster (Grey)
C90	Soft Case DMM
Fluke 700-IV	Current Shunt
FOA ST/ST	ST to ST Coupling
FOC-ST/FC	ST to FC Fiber Optic Converter Cable (Multimode)
FOC-ST/SC	SC/ST 62.5 µm Multimode patch cable
FOC-ST/SMA	ST to SMA Fiber Optic Converter Cable (Multimode)
FOC-ST/ST	ST to ST Fiber Optic Patch Cable (Multimode)
FOM	Fiber Optic Meter includes an optical power meter, two multimode ST-ST patch cables, one multimode ST-ST adapter, instruction sheet and instrument case.
FOS-1300	1300 nm Fiber Optic Source (LED, Multimode)
FOS-850	850 nm Fiber Optic Source (LED, Multimode)
FOS-850/1300	Fiber Optic LED Power Source that transmits 850 nm and 1300 nm wavelengths
i1010	Clamp-on AC/DC Current Probe
i410	Clamp-on AC/DC Current Probe
PV350	Pressure/Vacuum Module (0 to 350 PSI)
TL20	63" Test Lead Set
TL22	63" Right Angle Silicone Test Lead Set

TL24	63" Right Angle/Straight Silicone Test Leads
TL71	Premium DMM Test Lead Assembly
TL74	4 mm Diameter Test Leads
TL75	48" Hardpoint Test Lead Set
TP20	Industrial Test Probe
Y8140A	48" Slim Flex Test Lead Set

For Accessories -- Please Request Information REQUEST INFO

*** All prices subject to change without notice**

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